

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

SPECIFICATION

INVENTION: MATTRESS CAVITY CUSHION SYSTEM

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MATTRESS CAVITY CUSHION SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of provisional Application No. 60/260,373 filed January 8, 2001.

FIELD OF THE INVENTION

[0002] This invention relates to the field of mattresses equipped to accommodate a bedpan system.

BACKGROUND OF THE INVENTION

[0003] Conventional bedpan systems pose many problems for the person using the bedpan as well as the attendant helping the person. Such difficulties include rolling the person over on his or her side, placing the bedpan on the bed, rolling the person onto the bedpan for use and off of the bedpan after use. The difficulties associated with rolling the person often lead to the person slipping off the bedpan and onto the mattress, thus soiling the bed linens and the person's garments. Further, if the person is very large or completely immobile, there is a high probability that the attendant may become injured by the physical exertion associated with moving the large or immobile person onto and off of the bedpan. Such problems can cause embarrassing, uncomfortable, and potentially dangerous circumstances for both the person and the attendant.

[0004] Various attempts have been made to overcome the problems associated with the use of conventional bedpan systems. Some attempts have included

mattresses with cavities for accepting a bedpan. For example, U.S. Patent Nos. 4, 011,610 and 6,243,898 B1 disclose mattresses with plugs which must be manually removed and inserted in order to expose a cavity equipped to accept a bedpan assembly. U.S. Patent No. 4,122,565 also discloses a mattress with a cavity, the cavity being closed by way of a slidable plug. These attempts do not provide for the careful positioning of the bedpan directly under the person such that the risks of leaks or spills in the cavity or on the person are avoided. Moreover, use of the removable plugs generally disadvantageously requires some movement of the person.

[0005] Other attempts have included placing inflatable mattresses or devices equipped to accept a bedpan assembly on top of a conventional mattress. For example, U.S. Patent No. 5, 081,721 discloses an inflatable mattress with an access area to accommodate a bedpan in its middle section. The inflatable mattress is laid upon a standard mattress and, when inflated, lifts the person so that the bedpan can be inserted under him or her. U.S. Patent No. 6, 223,368B1 discloses an inflatable support device which is affixed to a conventional mattress and which can accommodate a bedpan once inflated. With these types of arrangements, the person is deprived of the comforts of a conventional mattress and may be left in an awkward position when on the inflated mattress or device.

[0006] To overcome the problems associated with the use of conventional bedpan systems, there is needed a mattress and bedpan system which provides for the careful placement of a bedpan directly under a person with minimal movement of the person, minimal physical exertion of the attendant, and

minimal risk of leaks or spills on the mattress or person when the bedpan is being used or removed.

SUMMARY OF THE INVENTION

[0007] These needs are met in accordance with the present invention which provides a mattress system having a mattress with a top surface and a bottom surface. A cavity is arranged in the mattress. The cavity is open at least toward the top surface and has a defined size. An expandable cushion is arranged in the cavity. The expandable cushion can advantageously fill the cavity in an expanded state so as to provide a comfortable mattress, and, in a contracted state, allow for a human waster container, such as a bedpan or wastebag, to be inserted into the cavity for use by a person lying on the mattress. This advantageously minimizes, or eliminates, movement of the person in order to facilitate use of the bedpan or wastebag.

[0008] In accordance with the present invention, a control system is operatively coupled with the expandable cushion to control the expansion and contraction thereof. In one embodiment, the cushion is an inflatable and deflatable cushion. Of course, other means for expanding the cushion can be used, such as liquid fluids, mechanical measures, or the like.

[0009] While the present invention is drawn to a mattress, it is applicable to any support structure with a top surface and a bottom surface on which a person may rest or recline. For example, a reclining chair, sofa, seat cushion, or the like

may be provided with the cavity cushion system of the present invention. In that regard, it is intended the term mattress is to include any such support structure.

[0010] Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 is a longitudinal cross-section view, taken along line I-I of Figure 3, of the mattress system of the present invention depicted with the addition of a bedpan and a person lying on the mattress.

[0012] Figure 2 is a longitudinal cross-section view of the mattress depicted in Figure 1 with the bedpan removed and the cushion fully expanded according to the present invention.

[0013] Figure 3 is a top perspective view of the mattress according to the present invention showing the cavity and the control switch used for expanding and contracting the cushion within the cavity.

[0014] Figure 4 is an enlarged detailed view of the mattress cavity with the bedpan positioned on top of the contracted cushion.

[0015] Figure 5 is an enlarged detailed view of the mattress cavity with the cushion fully expanded within the cavity.

[0016] Figure 5A is another embodiment of the invention as depicted in Figure 5 showing a mattress-like product on top of the fully expanded cushion.

[0017] Figure 6 is a top perspective view of the mattress, expanded cushion, and the control switch covered by a mattress protector.

[0018] Figure 7 is a top perspective view of the mattress with a bedsheet having openings providing access to the cavity and to the control switch.

[0019] Figure 8 is a top perspective view of the bedsheet depicted in Figure 7 shown in its open state allowing access to the cavity and control switch.

[0020] Figure 9 is a perspective view of the bottom portion of the mattress according to the present invention having a zippered access to the cavity.

[0021] Figure 10 is an enlarged detailed view illustrating a mattress-like product according to the invention, which fills the cavity when the mattress system of the present invention is not in use.

[0022] Figure 11 is an enlarged detailed view of an alternate embodiment according to the invention in which a wastebag is used instead of a bedpan.

[0023] Figure 11A is a cross sectional view taken along lines II-II of the mattress and wastebag system depicted in Figure 11.

[0024] Figure 12 is a top perspective view of a mattress having a cavity equipped with the wastebag system, and a control switch for expanding and contracting the cushion in the cavity according to the present invention.

[0025] Figure 13 is a detailed view of a control switch for use with the present invention.

[0026] Figure 14 is an cutaway perspective view illustrating the internal components of the control switch depicted in Figure 13.

[0027] Figure 15 is another embodiment of the invention depicted in Figures 7 and 8 showing a bedsheet gathered into the cavity prior to the placement of the bedpan or wastebag system.

[0028] Figure 16 is another embodiment of the invention depicted in Figure 15 with an underpad positioned on top of the gathered bedsheet.

[0029] Figure 17 is an enlarged perspective view of wastebag system according to the present invention.

[0030] Figure 18 is an enlarged detailed view of an alternative embodiment of the present invention showing the mattress cavity equipped with a retainer having a diameter larger than that of the cavity.

[0031] Figure 19 is an enlarged detailed view of the mattress cavity as depicted in Figure 18 with the cushion fully expanded within the cavity.

DETAILED DESCRIPTION OF THE DRAWINGS

[0032] In Figure 1, a person 10 is shown lying on a mattress 14. The mattress 14 has a cavity 17 arranged in a central portion of the mattress 14 (Figure 3) where a human waste container, such as a bedpan 12, would typically be arranged. Inside the cavity 17, an expandable cushion 16 (also known as a

“bladder”) is shown in its contracted state. The cushion 16 is attached to the bottom of the cavity 17 by an attachment 22. The cushion can be expanded, for example, by inflation with air, by filling with a liquid, or by mechanical measures such as with spring device. Arranged on the deflated cushion 16 is a bedpan 12, also shown in phantom 12', that fits in the cavity 17. The bedpan 12' can be inserted into the cavity 17 by an operator (user or attendant) who places the bedpan 12' into the cavity 17 between the person's legs 10', which may be bent if necessary to facilitate the process. Figure 4 shows an enlarged detailed view of the bedpan 12 on the contracted cushion 16.

[0033] Referring to Figures 3, 4, and 5, the mattress 14 is shown covered with a mattress protector 20. That portion of the mattress protector 20 extending into the cavity 17 is made of a pliable material 25, 26. The pliable material 25, 26 is attached to a retainer 24, depicted as a hoop or a ring. The retainer 24, which may be made of a flexible material, is recessed in the cavity 17 between the top and bottom surfaces of the mattress 14 on the periphery of the cavity 17. The retainer 24 is shown in Figures 4 and 5 in a position half-way between the top of the mattress 14 and the top of the cushion 16 in its deflated state. The bottom half of the pliable material 26 is attached to the top of the cushion 16 by way of an attachment 21 (for example Velcro®) (Figure 4). As a result of the attachment of the pliable material 25, 26 to the retainer 24, when the cushion 16 is expanded, the part of the pliable material 26 below the retainer 24 raises with the top of the cushion 16 while the part of the pliable material 25 above the retainer 24 stays in place (Figure 5). With this configuration, any

spills or leaks which occur, either when the cushion 16 is contracted or expanded, will be contained within the pliable material 25, 26 of the mattress protector 20.

[0034] Referring to Figure 4, the mattress 14 is shown with a maximum compression point 14" above an indenture load deflection plane 14'. A traditional mattress material may be provided above the deflection plane 14' and a firmer material may be provided below the deflection plane 14'. With this configuration, when the mattress 14 is compressed to its maximum compression point 14", there remains sufficient clearance between the maximum compression point 14" and the inflection plane 14' to position the bedpan 12 in the cavity 17.

[0035] Referring to Figures 5 and 5A, the cushion 16 may be equipped with vertical I-beams 27. The vertical I-beams 27 add to the stability of the fully expanded cushion 16 by forming a series of expandable chambers 16' within the cushion 16. The cushion 16 may also be equipped with an elastic material 28 at least on the sides of the cushion 16 to prevent deformation of the cushion 16 during expansion and contraction. The elastic material 28 is configured to stretch when the cushion 16 is inflated and to contract when the cushion 16 is deflated. To ensure that the fully expanded cushion 16 is of the same tactile consistency as the rest of the mattress 14, the top of the cushion 16 may be provided with a mattress-like product 29 (Figure 5A). The mattress-like product 29 is attached to the top of the cushion 16 and the bottom of the mattress protector 20 by attachments 21, 21'. If desired, the cushion 16 and/or expandable chambers 16' may be filled with a foam material (not shown).

[0036] Referring to Figure 5, ventilation openings 16" can be provided in the mattress protector 20 (see Figure 6 also) and in the expandable cushion 16 to help maintain a dry condition and provide stimulation to the area of the hips. In the embodiment shown in Figure 5A, the ventilation openings 16" are arranged on lateral sides of the cushion 16 in view of the use of the mattress-like product 29. Use of the ventilation openings 16" in an inflatable cushion 16 requires constant or intermittent use of an inflation source, such as an air pump. By constantly or intermittently using an air pump, the need for an absolutely air-tight cushion 16 is eliminated.

[0037] Figures 18 and 19 show an alternative embodiment of the mattress cavity 17 with the retainer 24 having a diameter or circumference greater than that of the cavity 17. The larger diameter of the retainer 24 causes an indenture 32 in the cavity 17 that serves to secure the retainer 24 within the cavity 17. The indenture 32 also provides extra room within the cavity 17 thus facilitating the expansion and contraction of the mattress-like product 29 on top of the cushion 16. When the cushion is fully expanded, the elastic material 28 contours against the indenture 32 (Figure 19).

[0038] The expansion and contraction of the cushion 16 is controlled by a control switch 15 which is depicted in Figure 13. The control switch 15 can be located on the top of the mattress 14 (Figure 3), on one of the sides 70, 71 of the mattress 14, or in any accessible location. Moreover, the switch can be a remote control device (not shown).

[0039] Referring to Figure 14, the control switch 15 is shown as part of a control unit 62. The control unit 62 may be housed within the mattress 14 or its support structure. Alternatively, it may be attached to a side of the mattress 14, or the support structure thereof. The depicted control unit 62 is an inflation and deflation mechanism wherein the control switch 15 is attached to a three-way valve 63. The three way valve 63 controls the operation of an air pump 61 and an air release mechanism 64. The air pump 61 and air release mechanism 64 are used to inflate and deflate the cushion 16. A switchable vacuum pump may also be used to deflate the cushion 16 (not shown). If an air pump 61 or a vacuum pump is used, it may be desirable for the cushion 16 and/or the expandable chambers 16' to be filled with a foam material. As alternative embodiments, the control unit 62 may house a fluidic pump or the control switch 15 may be used to control a mechanical mechanism, such as a spring device, located within the cushion 16 (not shown). Of course, any known mechanisms that may operably expand the cushion can be used within the context of the present invention.

[0040] Figures 3 and 6 depict the control switch 15 positioned on the top of the mattress 14. To provide access to the control switch 15 when it is in this position, the mattress protector 20 is provided with a flap 18. The flap 18 can be opened and closed to expose and conceal the control switch 15, respectively. The flap 18 is provided with a thick padding 19 and an attachment 11 (for example, Velcro®). When the flap 18 is closed, the attachment 11 secures the flap 18 to

the mattress protector 20 and the thick padding 19 ensures that the control switch 15 cannot be felt through the top of the mattress 14.

[0041] Figures 7 and 8 depict the bedsheet 30 for use with the mattress system of the present invention. The bedsheet 30 is provided with a slit which is closed by a fly or a flap 31. The fly or flap 31 may be secured to the bedsheet 30 with an attachment (not shown). When the sides of the fly or flap 31 are pulled apart, the cavity 17 is exposed. The bedsheet 30 may also be provided with a flap 34 to provide access to the control switch 15, the flap 34 being secured to the bedsheet 30 with an attachment 35 (for example, Velcro®) when closed. As an alternative to the bedsheet equipped with the fly 31, a traditional bedsheet 30 may be used (Figure 15). In this embodiment, the bedsheet 30 is gathered into the cavity 17 of the mattress 14 prior to the placement of the human waste container into the cavity 17. For added protection of the bedsheet from accidental spills, an underpad 80 may be placed on top of the gathered bedsheet 30 (Figure 16).

[0042] Referring to Figure 9, the bottom of the mattress 14 may be provided with a zippered opening 23 to facilitate the removal of the cushion 16 for cleaning, replacement, or if it is no longer needed.

[0043] Referring to Figure 10, a mattress cavity plug 42 can be inserted into the cavity 17 thereby turning the mattress 14 according to the present invention into a conventional mattress when the cavity cushion system of the present invention is not needed.

[0044] Figures 11, 12, and 17 describe an alternative embodiment using a wastebag 50 as the human waste receptacle. In this embodiment, a support ring 53-55 mates with the cavity 17 under spring tension. One portion of the support ring 54 is supported on the top surface of the mattress, another portion 55 extends into the cavity 17, and a third portion 53 completes the ring 53-55. The wastebag 50 is secured to the ring 53-55 by means of an elastic material 51. To facilitate the placement and removal of the support ring 53-55 into the cavity 17, a handle 56 extends from the support ring 53-55. The handle 56 acts like a spring so as to be under tension when the end of the handle 52 engages the cavity 17.

[0045] The operation of the mattress and cavity cushion system will now be described in conjunction to the figures. When the person 10 needs to use a human waste container such as a bedpan 12 or a wastebag 50, the operator exposes the cavity 17 by pulling each side 32 of the fly or flap 31 on the bedsheet 30. This exposes the cavity 17 with the fully expanded cushion 16 (Figures 6-8). The operator then uses the remote control device or the control switch 15 to contract the cushion 16. If the control switch 15 is located on the mattress 14, the operator pulls back the flap 34 on the bedsheet 30 to expose the flap 18 on the mattress protector 30 which in kind is pulled back to expose the control switch 15.

[0046] Once the cushion 16 is deflated, the operator is ready to insert the bedpan 12 or wastebag system 52-56 into the cavity. If a bedpan 12 is being used, the operator positions the bedpan 12 on the deflated cushion 16 within the

cavity 17 (Figure 1). It may be necessary to bend the person's knees 10' in order to position the bedpan 12. The remote control device or the control switch 15 is then used to expand the cushion 16 until the bedpan 12 is directly under the person 10. If the wastebag system is being used, upon contraction of the cushion 16, the operator will secure the support ring 52-56 with the attached wastebag 50 to the cavity 17. During use of the wastebag system 52-56, the cushion 16 is left in its deflated state.

[0047] When the person has completed using the bedpan 12 or wastebag system 52-56, the bedpan 12 or wastebag system 52-56 is removed and a clean bedpan 12 or wastebag system 52-56 may be placed in the cavity 17 for use while cleaning the person 10. After the person 10 has been cleaned, the operator removes the bedpan 12 or wastebag system 52-56 from the cavity 17 and uses the remote control or control switch 15 to fully expand the cushion 16. If the control switch 15 is located on the mattress, the operator then closes the flap 18 of the mattress protector 20 and the flap 34 of the bedsheet 30. Lastly, the operator closes the fly 31 of the bedsheet 30.

[0048] If the bedsheet embodiment of Figures 15 and 16 is used, then the operator gathers a bedsheet 30 into the cavity 17 and if desired, places an underpad 80 across the mattress so that it extends into the cavity. After this is done, the bedpan or wastebag system can be used as described above.

[0049] The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting. Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur

to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.